This principle of construction seems to apply the iron to the utmost possible advantage in resisting the force of the exploding charge. There is an eloquent testimony to the excellence of the system in one of the first guns made on the Fraser principle, which was tested to destruction in the preliminary trials that took place before the system was adopted, and is now to be seen in the *cemetery*, or place where such guns are preserved for inspection in the Royal Arsenal. This gun, a 64-pounder, having fired a greater weight of powder and shot than any other of its own size, and latterly with charges increased till it was destroyed, burst in this way: part of the tube, which was worn through, and the coil round the front of the tube came out and left the entire mass of the trunnion and breech-piece uninjured, so that not only would this bursting have done no injury to those who served the gun, but if a new tube and fore-part were put in, the trial might have commenced again.

Welding a coil, however large, is a much easier and less expensive process than forging and hammering into shape a mass of iron of much smaller size. However, the great size of the coils of Fraser guns of large calibre necessitated the employment of correspondingly large furnaces and machinery. These difficulties have been very successfully overcome in the Royal Gun Factories. The furnaces have been enlarged from a cubical content of 60 feet to 600 feet. At present a gun is being made of 35 tons weight, which will hurl a shot of 700lb. weight with a charge of 120lb. of powder (the battering charge for the ordinary 25-ton 600-pounder being 70lb.) All the coils for this enormous weapon have been welded without accident or hindrance. In one case as much as 28 tons of iron have been heated in one piece in the furnace, seized by the tongs, and placed in a glowing mass beneath the hammer. This is an achievement unprecedented in iron manufacture, and which reflects the highest credit on this most important Government department. Nowhere else, and for no other purpose, have such gigantic masses of metal to be heated and manipulated.

Figs. 3 and 4 show the parts of an Armstrong gun, and of a Fraser gun, before they are put together. Both are 300-pounders, and the engravings have been made from photographs of the actual guns.

NOTES

WE are in a position to state that the arrangements of the Eclipse Expedition are rapidly progressing,—thanks to the untiring labours of the strong Organising Committee, which meets almost daily. As we stated before, the Government are bringing all their power to bear in favour of the work, and, should the weather be favourable, we may expect such a series of observations as has never been made of an eclipsed sun. As at present arranged, there will be four parties. Beginning with Spain, we have one to Cadiz, in charge of the Rev. S. J. Perry, and one to Gibraltar, under Captain Noble. The English branch of the Anglo-American Expedition will be under the charge of Mr. Lockyer; while there will be a fourth small expedition, under the charge of Mr. Huggins, to Oran; the Cadiz, Gibraltar, and Oran parties will leave Portsmouth on the 5th of December in the *Urgent*. The Sicilian party will leave London on the night of the 7th by the Brenner pass, a ship of war meeting them at Naples. Although not a single official astronomer has volunteered to go, there will be lack of neither skill, discipline, nor organisation; and arrangements are already being made which will ensure a full and early publication by the Organising Committee of the scientific results obtained. Printed instructions are being prepared by the Committee for each class of observations. So much for the English Government Expedition. With regard to the American one, we may add that it has been no less strongly and carefully organised, with the distinct advantages that astronomy is more cultivated in America than it is here, that the official observatories are fully represented, and that as all the observers were present at the Eclipse in 1869, they therefore may be regarded as veterans. Professors Young, Pickering, Newcomb, Peters, Watson, Harkness, and others are at present in London, and are daily affording most valuable information to the Organising Committee and the various observers.

THE following memorial to Her Majesty's Government on the danger to which the scientific, literary, and art collections of Paris are now exposed, has been forwarded to the Earl of Granville from the University of Dublin:—"We, the undersigned, Provost, Fellows, and Scholars of Trinity College, and Professors of the University of Dublin, desire to express our satisfaction with the efforts made by Her Majesty's Government to restore peace in Europe, and our earnest hope—shared, we believe, by the nation at large—that these efforts may be eventually successful. But if, unhappily, our desire should not be realised, your memorialists venture to urge that the interposition of Her Majesty's Government may be directed to preserve, if possible, the great scientific, literary, and art collections of Paris, which are, in truth, the property of the whole civilised world. It is impossible to contemplate calmly the irreparable loss which the destruction of these collections, or even any serious injury to them, would inflict upon students of every nation. To avert, if possible, such a calamity, is now the duty of all; it is more especially the duty of every scientific and literary institution. Your memorialists would, therefore, in the name of our ancient University, earnestly entreat Her Majesty's Government to interpose their good offices with the belligerents, for the purpose of saving these matchless treasures from a danger which the fate of the Library of Strasburg proves to be only too real."

WE understand that Dr. Neil Arnott, in addition to his recent munificent donations to the Universities, has just presented 500*l.* to the Aberdeen Mechanics' Institution, to aid in maintaining lectures in Physical Science.

AT the examination for Foundation Scholarships, held in the week after Easter, 1871, one or more scholarships will be obtainable by proficiency in the Natural Sciences, at Trinity College, Cambridge. Should one scholarship only be so assigned, preference will be given to the candidate who shows the greatest proficiency in physiology and the allied subjects. The Examination in the Natural Sciences is open to all undergraduate members o the Universities of Oxford and Cambridge. The value of the scholarship is about 80*l.* per annum for five or six years.

DR. MICHAEL FOSTER (the newly-appointed Prælector of Physiology at Trinity College, Cambridge) commenced on the 14th inst. his course of lectures in a part of the new museums, which has been temporarily fitted up as a Physiological Laboratory. He gave a lucid and able exposition of the three great factors of life—contractility, as evinced chiefly in muscles; irritability, as evinced chiefly in the nervous system; and secretion. Dilating upon the much-vexed question, how far these are attributable to physical agencies, or are to be referred to another agency called "Life," he compared the latter view to a fortress closely besieged by an able band of investigators who are ever narrowing its area, and pressing the physical forces closer and closer upon it. But it has not yet capitulated. No one has a right to say that it will or will not capitulate; and till it has done so we are perfectly justified in regarding it as an entity, as a something to be taken into account in the investigation and the attempts at the explanation of living processes. He should still, therefore, use the term without committing himself to either view. He gave definitions of Physiology and Morphology. He spoke of the enormous importance of vivisection to the advance

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of Physiology. By it Vesalius might be said to have laid the foundations of Physiology; by it Harvey had been enabled to obtain the proofs of his great discovery. Without it all that had been written on Physiology would have gone for very little, and we should still have been in the Aristotelean mists darkened by the theories of the Schoolmen. He wished, however, to state that in the teaching of Physiology it would be necessary for him to resort to it much. He stated the plan he intended to pursue in carrying out the intentions of those who had placed him in that honourable position. Lectures he did not regard as a very fructifying mode of sowing seed. He thought it far better that men should work and see for themselves. With the munificent aid of Trinity College, he hoped, ere long, to make the physiological laboratory in Cambridge one of the best working laboratories in the country. He intended to have practical classes in addition to the lectures; and students who were competent would have opportunities for private work. It would be a labour of love to him to render practical aid to those who needed it, and to promote the study of physiology by every means in his power.—A considerable number of the senior members of the University were present, as well as undergraduates, and warmly applauded at the close of the lecture. The lectures are for the present open to all members of the University without fee.

. AT the recent examination for the Natural and Experimental Science Moderatorship at Trinity College, Dublin, Gold Medals were awarded to R. Apjohn, W. F. Burton, and T. F. Fleetwood (*Sch.*), and a Silver Medal to R. Barrington. The subjects examined in were—1. Physics; 2. Chemistry; 3. Mineralogy and Geology; 4. Palæontology, Zoology, and Botany. No candidate was allowed to present himself for examination in more than two of the four branches.

REV. PROF. HAUGHTON, M.D., F.R.S., has commenced a course of Lectures in Trinity College, Dublin, on Physical Geology, and Prof. Macalister, M.D., a course on the Anatomy, Physiology, and Classification of the Mollusca.

BY the resignation of Mr. J. J. Bennett, the office of Keeper of the Botanical Collections at the British Museum is now vacant. The appointment rests actually with three only of the trustees, the Archbishop of Canterbury, the Lord Chancellor, and the Speaker of the House of Commons, by virtue of their offices. Among the whole body of the trustees, who would naturally be consulted, there are only four scientific men, the President of the Royal Society, Sir R. J. Murchison, Lord Enniskillen, and Sir Philip Grey Egerton. Now that we are about to remove our national collections to a new building erected for the purpose, the suggestion naturally arises whether this is a condition of things which is desirable to perpetuate. The whole subject of the mode of appointments to these Government offices is one well worthy of the consideration of the Royal Science Commission. Mr. Bennett entered the Museum in 1829 as assistant, and succeeded the late Robert Brown as Keeper at his death in 1858. Mr. W. Carruthers, the present senior assistant, on whom the appointment would naturally fall, and who is so well known for his researches in vegetable palæontology, entered on that office in 1859.

THE first course of Cantor Lectures of the Society of Arts for the ensuing Session will be "On Artists' Colours and Pigments," by Frederick S. Barff, M.A., F.C.S., and Fellow of the Cambridge Philosophical Society. It will consist of five lectures, to be delivered on Monday evenings, the 21st and 28th November, and the 5th, 12th, and 19th December, at eight o'clock. These lectures will treat of—the Nature of Colour; Chemistry and Manufacture of Colours and Pigments; Vehicles and Media used in Painting; Fresco and Silicious Painting; Destructive Influences on Colours, &c. Other courses of lectures are under arrangement for delivery during the Session. These lectures are open to members, each of whom has the privilege of introducing two friends to each lecture.

THE *Gardener's Chronicle* states that an interesting exhibition of fruit has been recently opened at Appenzell, Switzerland. Eight communes have furnished 689 exhibits, comprising 80 sorts of apples and 120 of pears. The fruits are arranged according to the height above the sea of the localities where they are grown. Thus, in the lowest zone are shown fruits which have been produced from 1,300 to 2,000 feet above the sea; in the next, those grown at an elevation of 2,000 to 2,600 feet; in the third group, those gathered at a height of 2,600 to 3,000 feet; and lastly, are exhibited fruits produced above the last-mentioned elevation. Great care has been taken to ensure the accurate nomenclature of the fruits exhibited.

A REMARKABLY low wave of temperature passed over these islands in the middle of this month. At Blackheath the mean temperature for the week ending Nov. 16 was nearly 7° below the average. It is remarkable that the wind was in the W.S.W. during nearly the whole of the week, the air being almost saturated with moisture, and yet the rainfall scarcely appreciable, 0·04 in. For the fourteen stations in England, eight in Scotland, and one in Ireland, recorded by Mr. Glaisher in the *Gardener's Chronicle*, the lowest minimum was 19·0° at Paisley, the highest, 31·5°, at Norwich. The mean temperature was nearly the same in Scotland as in England, about 37·5°. Another singular meteorological phenomenon occurred this week in the successive thunderstorms which burst over London from 3 A.M. on Tuesday morning the 22nd to 6 A.M. on Wednesday morning the 23rd. The wind was blowing strongly from the S.W. during the whole time, with occasional violent rain, and the average temperature was about 40° F.

THE Address on Medicine at the annual meeting of the British Medical Association will be delivered by Dr. George Johnson, and that in Surgery by Prof. Lister.

THE current number of *Fraser's Magazine* contains the first portion of a paper on "Mystic Trees and Flowers," which will interest those who have paid any attention to the subject of Tree-worship, with regard to the origin of which no clear theory has yet been proposed. The writer considers that the religious homage paid to trees "must be referred to a distinct religious phase in the development of races, and to a period later than the ideals and myths with which poets invested them." The legends and superstitions of all countries are brought together, showing the points of convergence of the great religions of ancient races; and the connection of the folk-lore of the present day with its prototypes in all ages and in all nations. Reference is made to the recent researches into the history of the popular tales of different countries, and the whole paper teems with suggestive facts. The principal trees dwelt upon in this instalment are the apple, oak, ash, lime, willow, palm, elder, and juniper.

THE *Engineer* states that when the Russian American telegraph is completed the following feat will be possible. A telegram from Alaska for New York, leaving Sitka, say at 6.40 on Monday morning, would be received at Nicoleaf, Siberia, at six minutes past one on Tuesday morning; at St. Petersburgh, Russia, at three minutes past six on Monday evening; at London twenty-two minutes past four on Monday afternoon; and at New York at forty-six minutes past eleven on Monday forenoon. Thus, allowing twenty minutes for each re-transmission, a message may start on the morning of one day, to be received and transmitted the next day, again received and sent on the afternoon of the day it starts, and finally reaches its destination on the forenoon of the first day, the whole taking place in one hour's time.

FOR the purpose of connecting the Madras Observatory with the midnight and noon guns, the Indian Government has voted 200*l*.

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